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Immune Evasion Mechanisms of Zoonotic Protozoan Parasite *Toxoplasma Gondii* in Mammalian Host

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Toxoplasma gondii is a zoonotic pathogen that causes toxoplasmosis, a contagious disease affecting most mammals, including livestock, wild animals, and humans. Toxoplasmosis in livestock causes miscarriages or stillbirths, resulting in economic damage to farmers, and posing a challenge in animal husbandry. Moreover, cases of transmission to humans have recently shown an increasing trend annually. Thus *T. gondii* is now an important pathogen that requires immediate attention, both from animal and public health perspectives. However, there is still no vaccine or preventative medicine. Therefore, it is required to promote research on the development of novel treatment methods for toxoplasmosis and the elucidation of the host immune responses–parasite interactions in host cells. Interferon- γ (IFN- γ) is critical for anti-*T. gondii* responses in mammalian host, however, detailed mechanisms of host immune responses and parasite virulence mechanisms are still unclear. In this study, at first, we showed that IFN- γ induced tryptophan degradation by indole-2,3-dioxygenase (IDO1) plays an important role in the IFN- γ -induced anti-*T. gondii* response. Next, we focused on *T. gondii* virulence mechanisms and analyzed the role of TgGRA15 to suppress IFN- γ -dependent immunity. We generated GRA15 deficient *T. gondii* by Cas9/CRISPR system, and showed that IDO1-dependent anti-*T. gondii* response is inhibited TgGRA15-dependently. We also showed that *T. gondii* infection indirectly reduces IDO1 protein levels via iNOS expressed in hepatocytes stimulated with IL-1 β that is produced from infected monocytes in a manner dependent on GRA15. Thus, we have demonstrated that iNOS in humans is a pro-*Toxoplasma* host factor that promotes the growth of the parasite.



Research Biography

Hironori Bando received his PhD degree on Animal and Food Hygiene from Obihiro University of Agriculture and Veterinary Medicine in 2013. He belonged to Research Institute for Microbial Diseases Osaka University from 2013 to 2019 as a specially appointed assistant professor. Since 2019, he has belonged to Tohoku University Graduate School of Agricultural Science as an assistant professor. His research interest is to study the immunology of host parasite relationships (Immunoparasitology).